Unit 3

FORCE

Learning Objectives

IJQVJU

After learning this lesson, students will be able to

- define movements and actions
- define force
- know different types of forces
- know the force of friction
- understand the need and significance of frictional force

3.1 Simple movements and actions

In our daily life, we do different actions such as pushing, pulling, twisting and turning. By doing these actions we move or change the shape of an object.

- Change in position of an object is called **movement**.
- **Action** is the motion which gives the required result.

Let us look at the pictures below to understand movement and action better

The player hits the ball with hockey stick

Boys are riding bicycle

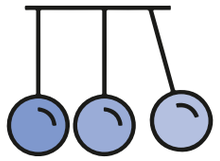
In the above pictures,

What moves? _____, _____

What is the action? _____, _____

Motion

When an object or a thing moves from one place to another, it is said to be in **motion**.



Let us speak

3.2 Force

Force is a push or a pull on an object which make it move, changes its shape or stops it from moving.

- Force involves an interaction between two or more objects.
- Force can lift or drop an object.

Without force, we can't move any object.

PIZAWS

Observe and Discuss

3.2.1 Push

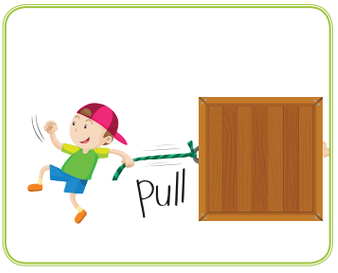
Look and say: What kind of actions do the pictures denote?

Here, all the pictures show pushing action.

When a force is applied in the direction of an object, it is called **push**.

3.2.2 Pull

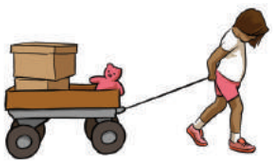
Look and say: What kind of actions do the pictures say?



Here all the pictures show pulling action.

When a force is applied in the direction opposite to the direction of an object, it is called **pull**.

Put a tick (✓) mark for the pictures of motion.



Classify the following - Push or Pull?

S.No	Activities	Push / Pull
1	Riding the bicycle	
2	Moving the table towards you	
3	Dragging the chair	
4	Moving a car to start	
5	Opening the window	
6	Stretching the rubber band	
7	Removing the shoe laces	

3.3 Effect of forces

Energy is needed to apply force

Force helps us to do the following things

- Force can change the direction
- Force can change the speed
- Force can stop a moving object
- Force can change the shape

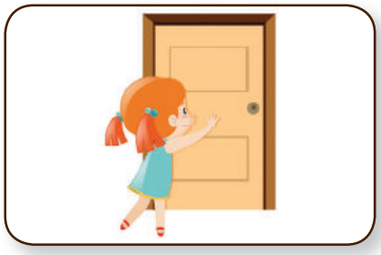
Force changes direction

Here, in the picture, a boy hits the shuttlecock and it reaches the other boy. He hits it again with the racket to move it to the opposite direction.

Force changes motion

- The cycle moves forward because force is applied on the cycle by pedaling.
- When we stop pedaling and apply the break, the cycle comes to rest.

Some applications of force in everyday life



Opening the door

Pulling rope in tug of war

Pulling rope from well

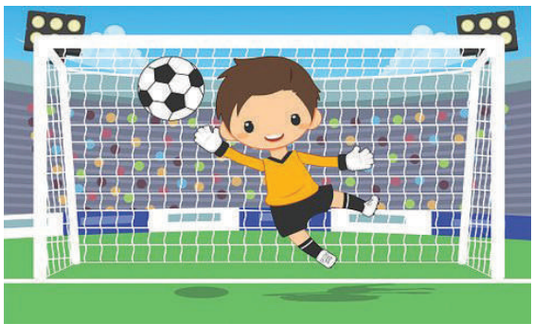
Force can change the speed

Force can change the speed of a body which is already in motion by providing more force on it.

Ram and his brother are playing with a toy car. Ram tries to move the toy car and his brother stops it from the opposite direction to slow down the toy car.

Thus, force changes the speed of an object.

Force can stop a moving object



An object stops moving when we apply force in the opposite direction.

- Have you played football game?
- How will you stop the ball?
- The goal keeper applies force and stops the ball.

Force can change the shape

- When an inflated balloon or water balloon is pressed, some force is applied on both sides of the balloon. Thus, it changes its shape.
- While squeezing a plastic water bottle force is applied on all sides of the bottle. Thus, the shape and size of the bottle is changed.

Less force is required in pulling than in pushing. So it is easy to pull than push an object.

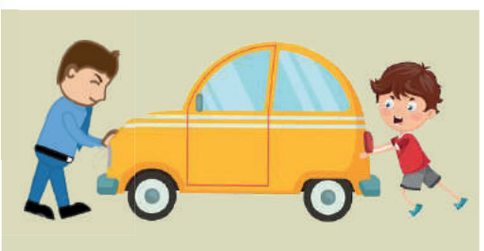
Match the following.

Stops the motion

Changes the direction

Changes the shape

Changes the speed



3.4.Types of force

Contact Force

When a force is applied by touching the object, it is called contact force.

Eg : Lighting a match stick

Contact force is classified into three.

1. Muscular force 2. Mechanical force 3. Frictional force

Non-Contact Force

When a force is applied without touching an object, it is called non-contact force.

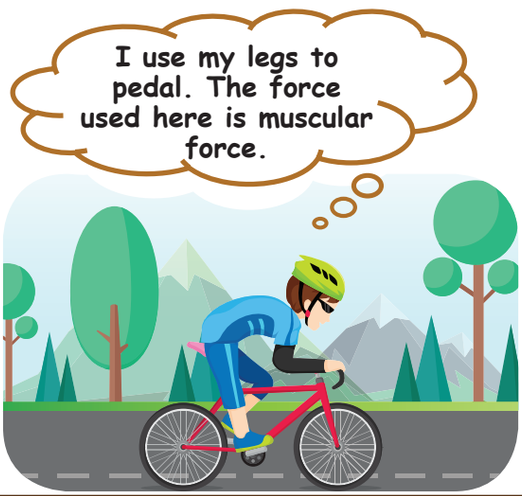
Eg. Vaccum cleaner, Magnet.

Non - contact force is classified into two.

1. Gravitational force 2. Magnetic force

Muscular force

The force applied by using the parts of our body is called **muscular force.**



Mechanical force

The force applied by a machine is called **mechanical force.**

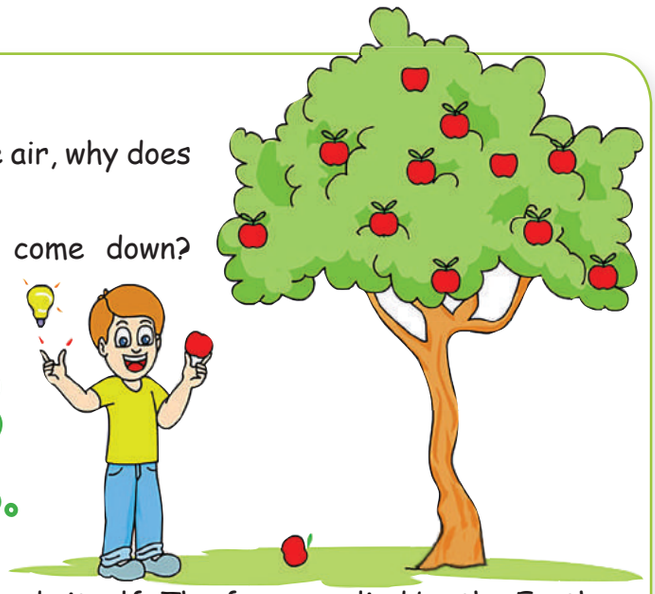
Example:

Using bulldozer to dig ground

Grinding using a mixer grinder

Gravitational force

- When you throw a ball up in the air, why does it come down?
- When we jump, why do we come down? Why don't we fly?

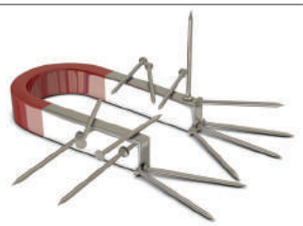


Why this happens?

The Earth pulls all the objects towards itself. The force applied by the Earth to pull objects towards itself is called **gravitational force.**

Magnetic force

A magnet is a material that attracts things made of iron. The force that attracts things is called **magnetic force.**

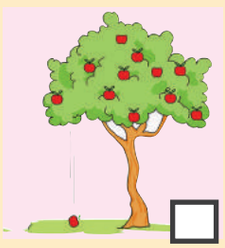


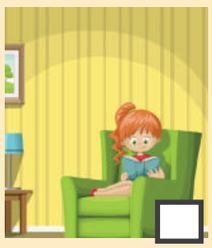
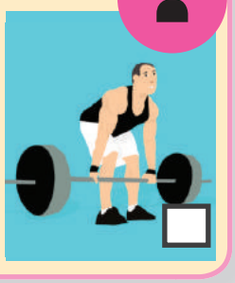
Observe the picture and write the kind of force involved here.




_____ _____ _____ _____

Tick (✓) the muscular force.

Frictional force

When we roll down a ball on grass ground, it slows down and finally stops. We know that an object cannot stop without force. The force that stopped the ball is frictional force. Force exerted by the surface when an object moves over it is called **Frictional force**.

Think! Why do we sprinkle powder on the carom board before playing carrom?

3.5 Friction

When we use eraser on a paper, the shape of the eraser changes. Why? It is because of the friction between the eraser and the paper.

Friction is a force of actions between two surfaces in contact or when they slide over one another.

Do you Know? Early man accidentally discovered fire by rubbing two flint stones (chikimuki kal) together. The frictional force between two stones created a spark.

Classify

List out the push activities

_____

_____

_____

List out the pull activity

_____

_____

_____

List the frictions here

_____

_____

_____

EVALUATION

VGCQ9Q

I. Fill in the blanks with suitable words.

(Push, force, pull, speed, gravitational force, direction, Muscular)

1. A ---------is needed to make a stationary object move.
2. The force applied with the help of muscle is called ---------- force.
3. ---------- and ---------- are known as forces.
4. The reason for the fruits to fall from the tree is ----------.
5. Force changes the ---------- and ----------.

II. Match the words with their pictures.

Hitting a ball
Lifting a car
Muscular force
Friction
Pulling
Mechanical force

III. Answer the following questions.

1. How do you open the door?
2. Name the types of force.
3. Which force is involved in collecting water from well?
4. What is push?
5. What kind of force is used to make clay pot?

IV. Sujatha places a magnet near some objects. What are the objects that will be attracted from the list given below?

(note, pin, coin, rubber, shirt, comb, steel tumbler, nail)

V. Think and answer.

Raja throws a ball, a stone, a paper and a leaf up in the air? What kind of force is involved here? What will happen to them?